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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/023,317	12/17/2001	Christian Plank	VOS-22	2272

1473 7590 12/17/2004

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EXAMINER	
ANGELL, JON E	

ART UNIT	PAPER NUMBER
1635	

DATE MAILED: 12/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/023,317	PLANK ET AL.	
	Examiner	Art Unit	
	Jon Eric Angell	1635	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14,16 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,16 and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/01;8/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Action is in response to the communication filed on 8/30/04. The amendment has been entered. Claims 1-14, 16 and 17 are currently pending in the application and are addressed herein.

Election/Restrictions

Applicant's election of the indicated species (Poly{[O,O'-bis-(2-aminoethyl)-poly(ethylene glycol)]-co-[(3-mercaptopropionyl)-glutamic acid]-graft-(Ac-Tr-$Glu_5)_2$Lys-Ahx-Cys}) in the reply filed on 8/30/04 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 12/17/01 and 8/30/04 are acknowledged. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements are being considered by the examiner (see attached forms(892)).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-14, 16 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14 is drawn to a combination of a carrier complex comprising a nucleic acid molecule and a charged copolymer. The charged copolymer has the general formula indicated in claim 1 (see claim 1, general formula I). With respect to the copolymer, claim 1 indicates in part (iv) that the "X" group of formula I is a substituted aromatic compound with three functional groupings "$W_1Y_1Z_1$, wherein W, Y and Z...". Part (iv) of claim 1 renders the claim indefinite because the grouping "$W_1Y_1Z_1$" does not constitute three different groupings. It is noted that "$W_1Y_1Z_1$" may be a typographical error that should be "W, Y, and Z" or alternatively, "W_1, Y_1, and Z_1". However, in the instant claims, claim 1-part (iv) only encompasses one substituted aromatic compound that compound being "$W_1Y_1Z_1$" wherein "$W_1Y_1Z_1$" is not defined in the disclosure. Further, claim 1, part (iv) also recites, "wherein W, Y and Z have the meaning..." This recitation also renders the claim indefinite because it is not clear if "W, Y and Z" in claim 1, part (iv) refers to W, Y and Z_m disclosed in general formula I (claim 1) or if "W, Y and Z" refers to "W_1, Y_1, and Z_1" in part (iv). Additionally, the last line of claim 1 recites, "**1** is 1 to 5" (emphasis added). This recitation renders the claim indefinite because it is not clear what the "**1**" is intended to refer to. It is noted that this may be a typographical error wherein the "**1**" is intended to be "I"; however, as currently disclosed, the "**1**" in the last line of claim 1 renders the claim indefinite. It is noted that claim 1 is an independent claim from which all other claims depend. Therefore, all dependent claims are rejected for the same reasons because they must, by definition encompass all of the limitations set forth in the independent claim.

Claim 17 recites "the combination of claim 1, wherein I is 1". This claim is indefinite because it is unclear if "I" refers to general formula "I" (see claim 1 line 2) or if "I" refers to the "I" indicated within the formula under line 2.

Miscellaneous

With respect to the elected species, it is noted that no prior art was found for the elected species. Since no prior art was found, the Examiner has searched for prior art that meets the limitations set forth in general formula I, as broadly claimed in claim 1. The following art rejections are based on the fact that the art teaches broad limitations of the claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-9, 12-14, 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 98/19710 (Schacht et al; cited in IDS).

The instant claims are drawn to a combination of a carrier and a complex comprising a nucleic acid molecule and a charged copolymer of the general formula I (as indicated in claim 1). It is noted that the charged copolymer of formula I encompasses many different molecules, based on the number of possible variables within formula I. It is noted that claim1 indicates that "m and n are independently of each other 0, 1 or 2". Since m and n can be 0, the general formula I

encompasses molecules that belong to the general formal R-W-X-Y, wherein R is can be an amphiphillic polymer or derivative thereof (such as PEG), W and Y can be CO, NH, O, S or a linker group capable of reacting with SH, OH, CH, or NH_2.

Schacht teaches a combination of a carrier complex comprising a therapeutic nucleic acid molecule and a charged copolymer that meets the structural limitations of the claim, as indicated above (e.g., see Example 1, page 14-19; Figure 4; as well as claims 1-50). Specifically, Example 1 (pages 14-19) teaches a DNA delivery vehicle complex comprising a cationic copolymer material and a coating of hydrophilic polymer formed by polymeric precursors based on N-2-hydroxypropylmethacrylamide (HPMA) and reactive esters. Furthermore, Schacht discloses a structure that comprises general formula I (e.g., see page 15 and Figure 4). Schacht teaches that the copolymer can comprise a ligand for a higher eukaryotic cell. Specifically, Schacht teaches that the ligand can be a cell receptor-targeting moiety (see p. 6,lines 3-6). Schacht also teaches a structure of formula I wherein the structure comprises a charged peptide or peptide derivative (e.g., see paragraph bridging pages 10-11; Fig. 11). Schacht also teaches that the carrier can be a non-resorbable material such as the biologically inert pHPMA (e.g., see page 12, lines 8-11). Schact also teaches that the inert pHPMA can be modified to comprise biologically resorbable material such as peptide helices, etc. (e.g., see p. 12, lines 12-21). Claims 1-50 of Schacht also teach a method for making a polymer based delivery vehicle for nucleic acids that meets the limitations of the instant claims, as well as using the complex for delivery of the nucleic acid to a cell (e.g., see paragraph bridging pages 5-6; page 7 lines 20-25; and page 8, last paragraph for the teaching of delivery).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 98/19710 (Schacht et al; cited in IDS) in view of US Patent 5,863,984 (Doillon et al.).

The instant claims are drawn to a carrier complex as indicated above, wherein the carrier is a biologically resorbable material (claim 9), such as a collagen sponge (e.g, see claims 10-11).

Schacht teaches a combination of a carrier complex comprising a therapeutic nucleic acid molecule and a charged copolymer that meets the structural limitations of the claim, as indicated above (e.g., see Example 1, page 14-19; Figure 4; as well as claims 1-50). Specifically, Example 1 (pages 14-19) teaches a DNA delivery vehicle complex comprising a cationic copolymer material and a coating of hydrophilic polymer formed by polymeric precursors based on N-2-hydroxypropylmethacrylamide (HPMA) and reactive esters. Furthermore, Schacht discloses a

structure that comprises general formula I (e.g., see page 15 and Figure 4). Schacht teaches that the copolymer can comprise a ligand for a higher eukaryotic cell. Specifically, Schacht teaches that the ligand can be a cell receptor-targeting moiety (see p. 6,lines 3-6). Schacht also teaches a structure of formula I wherein the structure comprises a charged peptide or peptide derivative (e.g., see paragraph bridging pages 10-11; Fig. 11). Schacht also teaches that the carrier can be a non-resorbable material such as the biologically inert pHPMA (e.g., see page 12, lines 8-11). Schact also teaches that the inert pHPMA can be modified to comprise biologically resorbable material such as peptide helices, etc. (e.g., see p. 12, lines 12-21). Claims 1-50 of Schacht also teach a method for making a polymer based delivery vehicle for nucleic acids that meets the limitations of the instant claims, as well as using the complex for delivery of the nucleic acid to a cell (e.g., see paragraph bridging pages 5-6; page 7 lines 20-25; and page 8, last paragraph for the teaching of delivery).

Schact does not specifically teach that the carrier is a collagen sponge.

However, Doillon teaches a biologically acceptable matrix (e.g., a PEG-modified collagen sponge) that can be used as drug carriers. Specifically, Doillon teaches,

> "Thus, the stability of the PEG-modified collagen sponges might be linked to the repulsive properties of PEGs after which their covalent binding to the amino groups of the proteins stabilize the tertiary structure thereof. In addition, with PEG-conjugated liposomes used as drug carriers, the repulsive barrier properties of lipid-conjugated PEG polymer chains and polymer steric stabilization are the basis for their extended in vivo circulation times." (Emphasis added; See column 18, lines 10-21).

Therefore, it would have been prima facie obvious to one of ordinary skill in the art at the time of filing to modify the complex of Schacht, such that the complex was comprised in a collagen sponge, such as the one taught by Doillon with a reasonable expectation of success.

The motivation to make such a modification is provided by Doillon who teaches that the specific collagen sponge exhibits an extended stabilization when circulated in vivo, thus making it a better drug carrier for in vivo use.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jon Eric Angell whose telephone number is 571-272-0756. The examiner can normally be reached on Mon-Fri, with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John LeGuyader can be reached on 571-272-0760. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jon Eric Angell, Ph.D.
Art Unit 1635

DAVE TRONG NGUYEN
PRIMARY EXAMINER